

REMARKS/ARGUMENTS

The Applicants respectfully request reconsideration of this Application in view of the foregoing amendment and the following remarks. The Applicants originally submitted Claims 1-20 in the Application. Pursuant to a restriction requirement, the Applicants previously canceled Claims 16-20 without prejudice or disclaimer. The Applicants also previously added Claim 21. Accordingly, Claims 1-15 and 21 are currently pending in the Application.

I. Rejection of Claims 10 and 14 under 35 U.S.C. §102

True → The Examiner has rejected Claims 10 and 14 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,455,195 to Ramsey *et al.* ("Ramsey"). Ramsey, however, fails to teach that a portion of the metal passivation layer forms an intermetallic bond with the interconnect metal, as recited in Claim 10. Ramsey also fails to teach that another portion of the metal passivation layer forms a different intermetallic bond with the wire, as recited in Claim 10. Rather, Ramsey states that the palladium barrier layer 16 does not produce intermetallics with either of Ramsey's the bond wire 18 or the bond pad 14 (Column 4, Lines 6-11). Ramsey desires this so that there is no stress on the wire bond interface and the life of the integrated circuit is thereby extended (Column 2, Lines 9-11).

True → Accordingly, Ramsey fails to disclose each and every element of Claim 10. Therefore, Ramsey fails to anticipate Claim 10 and its dependent Claims. Consequently, the Applicants request the Examiner withdraw the §102 rejection of Claims 10 and 14.

II. Rejection of Claims 1-9, 11-13, 15 and 21 under 35 U.S.C. §103

The Examiner has rejected Claims 1-9, 11-13, 15 and 21 under 35 U.S.C. §103(a) as being unpatentable over Ramsey in view of U.S. Patent No. 6,187,680 to Costrini, *et al.* (“Costrini”) and Electronic Packaging and Interconnection Handbook, by Harper (“Harper”).

However, the combination of Ramsey Costrini and Harper fails to teach or suggest that a portion of the tantalum (Ta) layer forms an intermetallic bond with the copper (Cu) bond pad, and another portion of the tantalum (Ta) layer forms a tantalum aluminide (TaAl₃) compound to intermetallically bond the aluminum wire to the tantalum (Ta) layer, as recited in Claim 1. Rather, as discussed above, Ramsey’s palladium barrier layer serves to prevent intermetallic bond formation, which Ramsey desires because this prevents stress on the wire bond interface. The Applicants respectfully submit that Ramsey’s use of a palladium barrier layer to prevent intermetallic bond formation teaches away from the presently claimed inventions, which is a strong indication of nonobviousness.

Moreover, the asserted combination of Ramsey in view of Costrini fails to establish a *prima facie* case of obviousness because the asserted combination of references is improper. The combination of Ramsey with Costrini is improper because a person having ordinary skill in the art would not be motivated to find or add to Ramsey the teachings and suggestions of Costrini, inasmuch as Costrini does not address the problem of using a barrier layer that prevents intermetallic bond formation, as required by Ramsey.

Contrary to the Examiner’s assertion, Costrini does not disclose encapsulating a bond pad with a Ta passivation layer. Rather, Costrini teaches a passivation layer 24, made of materials such as SiO₂ or Si₃N₄, capably of preventing moisture or ions from contacting the copper wiring 22

needed to teach same adv. ✓
(Column 4, Lines 25-32; FIGURE 2(a)). While Costrini indicates that a barrier layer 28, serving to ensure the throughput of electrical current, could be made of Ta (Column 4, Line 64 to Column 5, Line 5), there is no teaching or suggestion that a Ta barrier layer prevents intermetallic formation as required by Ramsey. In fact, the Examiner asserts that Costrini discloses the opposite by forming a tantalum aluminide compound, although the Applicants can not find this disclosure in Costrini. The Applicants would appreciate it if the Examiner could point out where Costrini teaches the formation of a tantalum aluminide compound. Even if such a disclosure is made by Costrini, forming an intermetallic is contrary to Ramsey's desire to prevent intermetallic formation. It follows therefore that there would be no motive to replace Ramsey's palladium barrier layer with Costrini's Ta barrier layer.

Harper fails to cure the above-mentioned deficient teachings of Ramsey or Costrini, in as much as Harper merely discloses different types of wire bonding techniques.

Accordingly, the combination of Ramsey, Costrini and Harper fails to teach or suggest each and every element recited in independent Claims 1 and 10 of the present application. Therefore, the combination fails to support a *prima facie* case of obviousness with respect to Claims 1 and 10 and their dependent claims. Hence, Claims 1-9, 11-13, 15 and 21 are not obvious in view of any combination of Ramsey, Costrini and Harper. The Applicants therefore requests that the Examiner withdraw the §103 rejection of the these claims.

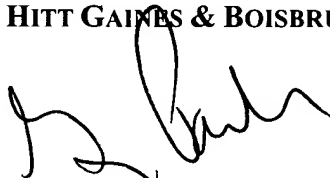
III. - Conclusion

In view of the foregoing amendment and remarks, the Applicants now see all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 1-15 and 21.

The Applicants request the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application.

Respectfully submitted,

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